What is claimed is:

1. A thin-film solar cell comprising a p-i-n double heterojunction structure that includes a polycrystalline p-layer, a polycrystalline i-layer, and a polycrystalline n-layer, wherein at least two of the p-layer, i-layer, and n-layer comprise a polycrystalline Cu material.

2. The solar cell of claim 1, wherein the p-layer, i-layer, and n-layer each comprise a polycrystalline Cu material.

3. The solar cell of claim 1, wherein the i-layer comprises an absorber layer, and the p-layer and the n-layer each comprise a window layer.

4. The solar cell of claim 1, wherein the i-layer has a maximum majority carrier concentration of about $10^{17}/cm^3$.

5. The solar cell of claim 1, wherein the i-layer has a majority carrier concentration of about $10^{14}/cm^3$ to about $10^{16}/cm^3$.

6. The solar cell of claim 4, wherein the p-layer and the n-layer each have a minimum respective carrier concentration of about $10^{18}/cm^3$.

7. The solar cell of claim 5, wherein the p-layer and the n-layer each have a respective carrier concentration of about $10^{19}/cm^3$ to about $10^{21}/cm^3$.

8. The solar cell of claim 1, wherein the p-layer is produced by annealing, the i-layer is produced by annealing, and the n-layer is produced by annealing.

9. The solar cell of claim 1, wherein each of the p-layer, i-layer, and n-layer further comprise a common cation or a common anion in addition to Cu.

10. The solar cell of claim 9, wherein each of the p-layer, i-layer, and n-layer comprise a common anion.

11. The solar cell of claim 1, wherein the n-layer is selected from a copper sulfide compound, a copper selenide compound, a copper telluride compound, an indium tin oxide compound, a zinc oxide compound, a tin oxide compound, and mixtures thereof.

12. The solar cell of claim 11, wherein the n-layer comprises a copper sulfide compound, and the i-layer is selected from a copper sulfide compound, a divalent metal copper sulfide compound, a divalent metal copper sulfide fluoride compound, a divalent metal copper sulfide oxide compound, a trivalent metal copper sulfide compound, a trivalent metal copper oxide sulfide compound, a trivalent metal copper sulfide fluoride compound, a quadrivalent metal copper sulfide compound, a quadrivalent metal copper sulfide oxide compound, a quadrivalent metal copper sulfide fluoride compound and mixtures thereof.

13. The solar cell of claim 12, wherein the p-layer is selected from a divalent metal copper sulfide compound, a divalent metal copper sulfide fluoride compound, a divalent metal copper sulfide oxide compound, a trivalent metal copper sulfide compound, a trivalent metal copper oxide sulfide compound, a trivalent metal copper sulfide fluoride compound, a quadrivalent metal copper sulfide compound, a quadrivalent metal copper sulfide oxide compound, a quadrivalent metal copper sulfide fluoride compound and mixtures thereof.

14. The solar cell of claim 11, wherein the n-layer comprises a copper selenide compound and the i-layer is selected from a copper indium gallium diselenide compound, a copper divalent metal selenide compound, a copper divalent metal selenide fluoride compound, a copper divalent metal selenide fluoride compound, a copper divalent metal selenide oxide compound, a copper trivalent metal selenide compound, a copper trivalent metal selenide fluoride compound, a copper trivalent metal selenide oxide compound, a copper quadrivalent metal selenide compound, a copper quadrivalent metal selenide fluoride compound, a copper quadrivalent metal selenide oxide compound, and mixtures thereof.

15. The solar cell of claim 14, wherein the p-layer is selected from a copper divalent metal selenide compound, a copper divalent metal selenide fluoride compound, a copper divalent metal selenide oxide compound, a copper trivalent metal selenide compound, a copper trivalent metal selenide fluoride compound, a copper trivalent metal selenide oxide compound, a copper quadrivalent metal selenide compound, a copper quadrivalent metal selenide fluoride compound, a copper quadrivalent metal selenide oxide compound and mixtures thereof.

16. The solar cell of claim 11, wherein the n-layer comprises a copper telluride compound and the i-layer is selected from a copper telluride compound, a copper divalent metal telluride compound, a copper divalent metal telluride fluoride compound, a copper divalent metal telluride oxide compound, a copper trivalent metal telluride compound, a copper trivalent metal telluride fluoride compound, a copper trivalent metal telluride oxide compound, a copper quadrivalent metal telluride compound, a copper quadrivalent metal telluride fluoride compound, a copper quadrivalent metal telluride oxide compound and mixtures thereof.

17. The solar cell of claim 16, wherein the p-layer is selected from a copper divalent metal telluride compound, a copper divalent metal telluride fluoride compound, a copper divalent metal telluride oxide compound, a copper trivalent metal telluride compound, a copper trivalent metal telluride fluoride compound, a copper trivalent metal telluride oxide compound, a copper quadrivalent metal telluride compound, a copper quadrivalent metal telluride fluoride compound, a copper quadrivalent metal telluride oxide compound and mixtures thereof.

18. The solar cell of claim 11, wherein the n-layer is selected from indium tin oxide, zinc oxide, and tin oxide.

19. The solar cell of claim 18, wherein the i-layer is selected from a copper oxide compound, a copper divalent metal oxide compound, a copper divalent metal oxide fluoride compound, a copper trivalent metal oxide compound, a copper trivalent

metal fluoride compound, a copper quadrivalent oxide compound, a copper quadrivalent oxide fluoride compound and mixtures thereof.

20. The solar cell of claim 19, wherein the p-layer is selected from a copper divalent metal oxide compound, a copper divalent metal oxide fluoride compound, a copper trivalent metal oxide compound, a copper trivalent metal oxyfluoride compound, a copper quadrivalent oxide compound, a copper quadrivalent oxide fluoride compound and mixtures thereof.

21. The solar cell of claim 1, wherein the combined thickness of the p-layer, i-layer, and n-layer is about 1 to about 5 microns.

22. The solar cell of claim 10, wherein the n-, i- and p-layers each comprise a common anion selected from oxygen, sulfur, selenium, and tellurium.

23. The solar cell of claim 22, wherein the n-, i- and p-layers each comprise a common anion selected from oxygen and sulfur.

24. The solar cell of claim 1, wherein at least the i-layer and the p-layer comprise a Cu material.

25. A thin-film solar cell comprising a p-i-n double heterojunction structure that includes a polycrystalline p-layer, a polycrystalline i-layer, and a polycrystalline n-layer, wherein each of the p-layer, i-layer, and n-layer comprise a common cation or a common anion.

26. The solar cell of claim 25, wherein each of the p-layer, i-layer, and n-layer comprise a common cation.

27. The solar cell of claim 25, wherein each of the p-layer, i-layer, and n-layer comprise a common anion.

28. The solar cell of claim 27, wherein the n-, i- and p-layers each comprise a common anion selected from oxygen, sulfur, selenium, and tellurium.

29. The solar cell of claim 28, wherein the n-, i- and p-layers each comprise a common anion selected from oxygen and sulfur.

30. The solar cell of claim 12, wherein the n-layer comprises MCu_2S_2 or MCuSF, wherein M is selected from Ca, Sr, Ba or mixtures thereof.

31. A method for making a thin-film solar cell, comprising:

depositing a p-type material, an intrinsic material, and a n-type material onto a substrate so as to form a p-i-n double heterojunction structure; and

annealing the p-type material, intrinsic material, and n-type material to produce a polycrystalline p-layer, a polycrystalline i-layer, and a polycrystalline n-layer, wherein at least two of the p-type layer, the intrinsic layer, and the n-type layer comprise a Cu material.

32. An electrical current generating system comprising at least one solar cell according to claim 1.

33. An electrical current generating system comprising at least one solar cell according to claim 25.